

RESEARCH PROBLEM STATEMENT

Problem Title:

Asphalt Binder Uniformity

No.: 05.3-1

Submitted By:

Cameron Petersen

E-mail: cameronpetersen@utah.gov

1. Briefly describe the problem to be addressed:

The hot-mix asphalt design is partly based on a known source and grade of PG Binder. If the delivered PG Binder's complex modulus and/or viscosity varies significantly, the mix volumetrics and dynamic modulus (E^*) could be adversely affected. The affected E^* will be critical when the designed pavement structure is based on a mechanistic design procedure partly based upon the characteristics of the proposed source and grade of the asphalt binder.

The Agency must know what the critical bounds are concerning delivered PG binder consistency and variation from the design binder.

Strategic Goal:

☐

Preservation

☐

Operation

☐

Capacity

☐

Safety

(Check all that apply)

2. List the research objective(s) to be accomplished:

1. Establish variation limits for delivered, discreet quantities of PG Binder to a paving project
2. Establish acceptable variation of delivered product from the mix-design binder
3. Address Mid-Range Temperature values as potential for use
4. Identify/quantify the sensitivity in performance to the variations in individual binder parameters
5. Identify appropriate measures of mix performance as they relate to binder properties

3. List the major tasks required to accomplish the research objective(s):

Estimated person-hours

1. Identify current binder grades and sources that are prevalent - Talk to Cameron
2. Work with refiners to define variabilities
3. Identify mixes that can be used to evaluate binder performance
4. Review statistical characteristics of binder parameter tests
5. Identify appropriate parameters for use in consistency control
6. Identify mix performance using the binders and define sensitivity

4. Outline the proposed schedule (when do you need this done, and how we will get there):

NEED FOR 2006-7 CONSTRUCTION SEASON. PG BINDER SAMPLES OBTAINED, MIX-DESIGNS PERFORMED, BINDER/MIX TESTS PERFORMED, DATA ANALYZED, AND REPORT DEVELOPED.

5. Indicate type of research and / or development project this is:

Large: ☒ Research Project ☐ Development Project

Small: ☐ Research Evaluation ☐ Experimental Feature ☐ New Product Evaluation ☐ Tech Transfer Initiative :

☐ Other _____

6. What type of entity is best suited to perform this project (University, Consultant, UDOT Staff, Other Agency, Other)?

UNIVERSITY OF NEVADA-RENO

7. What deliverable(s) would you like to receive at the end of the project? (e.g. useable technical product, design method, technique, training, workshops, report, manual of practice, policy, procedure, specification, standard, software, hardware, equipment, training tool, etc.)
AN ASPHALT BINDER UNIFORMITY SPECIFICATION

8. Describe how will this project be implemented at UDOT.

MODIFICATION OF THE PG BINDER MANAGEMENT PLAN, CHANGES IN THE BINDER SPECIFICATION 02745 AND/OR ESTABLISHMENT OF UNIFORMITY INCENTIVES

9. Describe how UDOT will benefit from the implementation of this project, and who the beneficiaries will be.

UNIFORM PRODUCTS USED IN THE HMA AND PRODUCTS REFLECTING THE MIX DESIGN MATERIALS PRODUCE PAVEMENTS WITH REALISTIC PERFORMANCE EXPECTATIONS. UDOT'S RISKS BASED UPON ECONOMIC DECISIONS THAT ALLOW PAVEMENT THICKNESS REDUCTION BASED ON BINDERS HAVING EXPECTED RHEOLOGICAL PROPERTIES WOULD BE MINIMIZED. ULTIMATELY, THE TAX PAYER WOULD BE THE BIGGEST BENEFICIARY. THEY SHOULD EXPECT THE PAVING PROJECT TO FULLY PERFORM THROUGHOUT ITS DESIGN LIFE..CONTRACTORS WOULD BENEFIT BY USING CONSISTENT PRODUCTS.

10. Describe the expected risks, obstacles, and strategies to overcome these.

EXPECTED BINDER PRODUCTION COSTS ARE POSSIBLE DURING A SUPPLIERS LEARNING CURVE DEVELOPMENT AND MODIFICATIONS TO QUALITY CONTROL PROCEDURES.

11. List the key UDOT Champion of this project (person who will help Research steer and lead this project, and will participate in implementation of the results): KEVIN VANFRANK

12. Estimate the cost of this research study including implementation effort (use person-hours from No. 3): \$90,000

13. List other champions (UDOT and non-UDOT) who are interested in and willing to participate in the Technical Advisory Committee for this study:

Name	Organization/Division/Region	Phone	Attended UTRAC?
A) Kevin VanFrank	UDOT Materials Division, Materials Research Engineer	965-4426	Yes
B) Tim Biel	UDOT Materials Division, Engineer For Materials	965-4859	Yes
C) Cameron Petersen	UDOT Materials Division, Asphalt Engineer	965-4296	No
D) Steve Niederhauser	UDOT Materials Division, Mts Engr. Assist.	965-4293	No
E) Rod Terry	UDOT Region One Materials Engineer	791-5305	Yes
F) Jim Cox	UDOT Region Three Materials Engineer	227-8035	Yes
G) Mohommad Rahman	Granite Construction	526-6130	Yes
H) Stephane Charmot	Koch Asphalt Products	673-6579	No

14. Identify other Utah agencies, regional or national agencies, or other groups that may have an interest in supporting this study:
TRB/AASHTO BINDER AND MIX EXPERT TASK GROUPS
ROCKY MOUNTAIN ASPHALT USER/PRODUCER GROUP